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DINOSAURS!

•DISCOVER THE GIANTS OF THE PREH LD•

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DINOSAURS!

DISCOVER THE GIANTS OF THE PREHISTORIC WORLD

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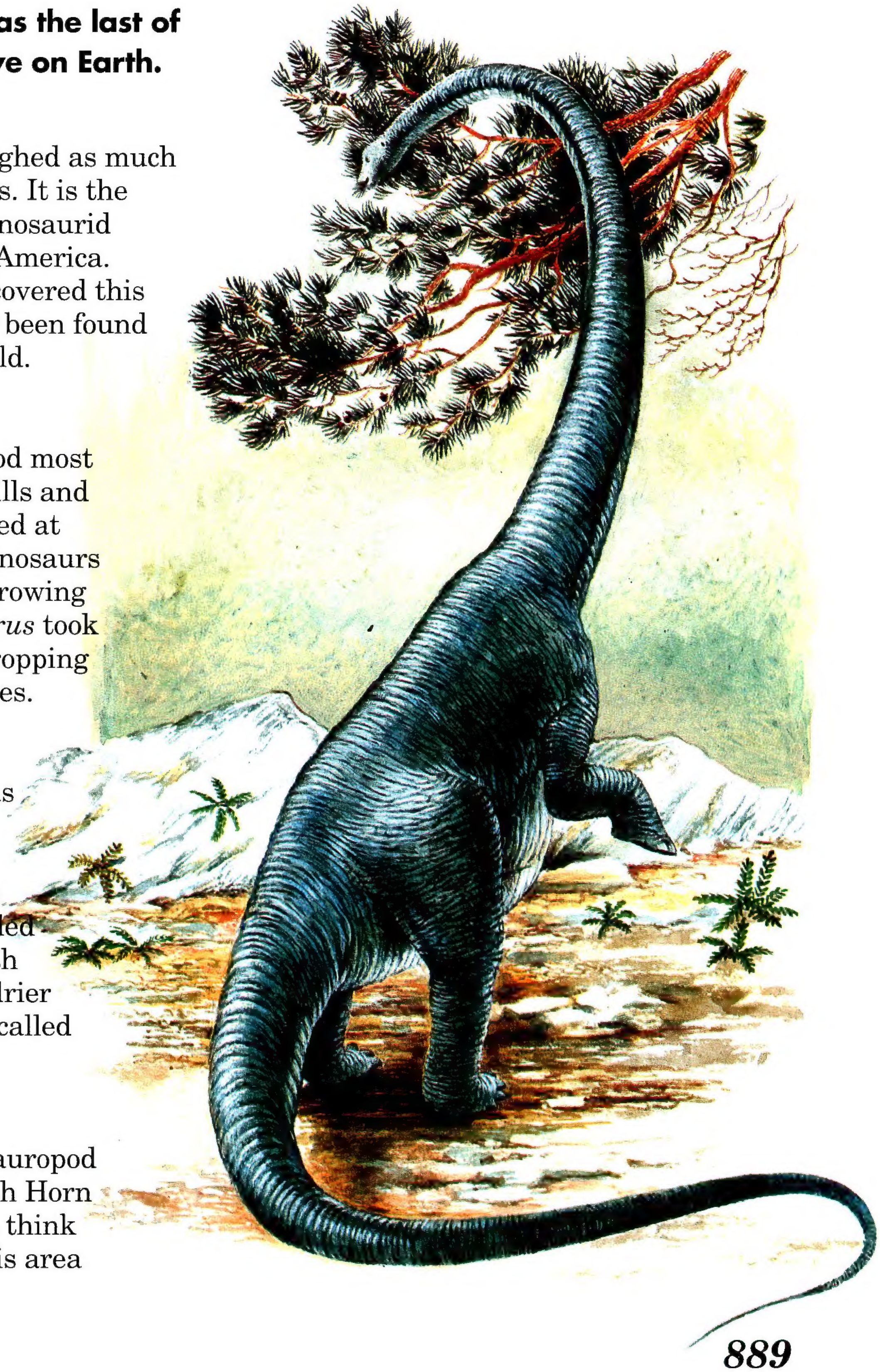
ALAMOSAURUS

Gigantic *Alamosaurus* was the last of the huge sauropods to live on Earth.

Alamosaurus weighed as much as five elephants. It is the only known titanosaurid (titanic reptile) from North America. Until *Alamosaurus* was discovered this group of dinosaurs had only been found in southern parts of the world.



FIRST PICK

During the Cretaceous Period most plant-eaters, like the duckbills and armoured nodosaurs, browsed at ground level. While these dinosaurs ate their way through low-growing ferns and plants, *Alamosaurus* took its pick of the taller trees, cropping the leaves from high branches.

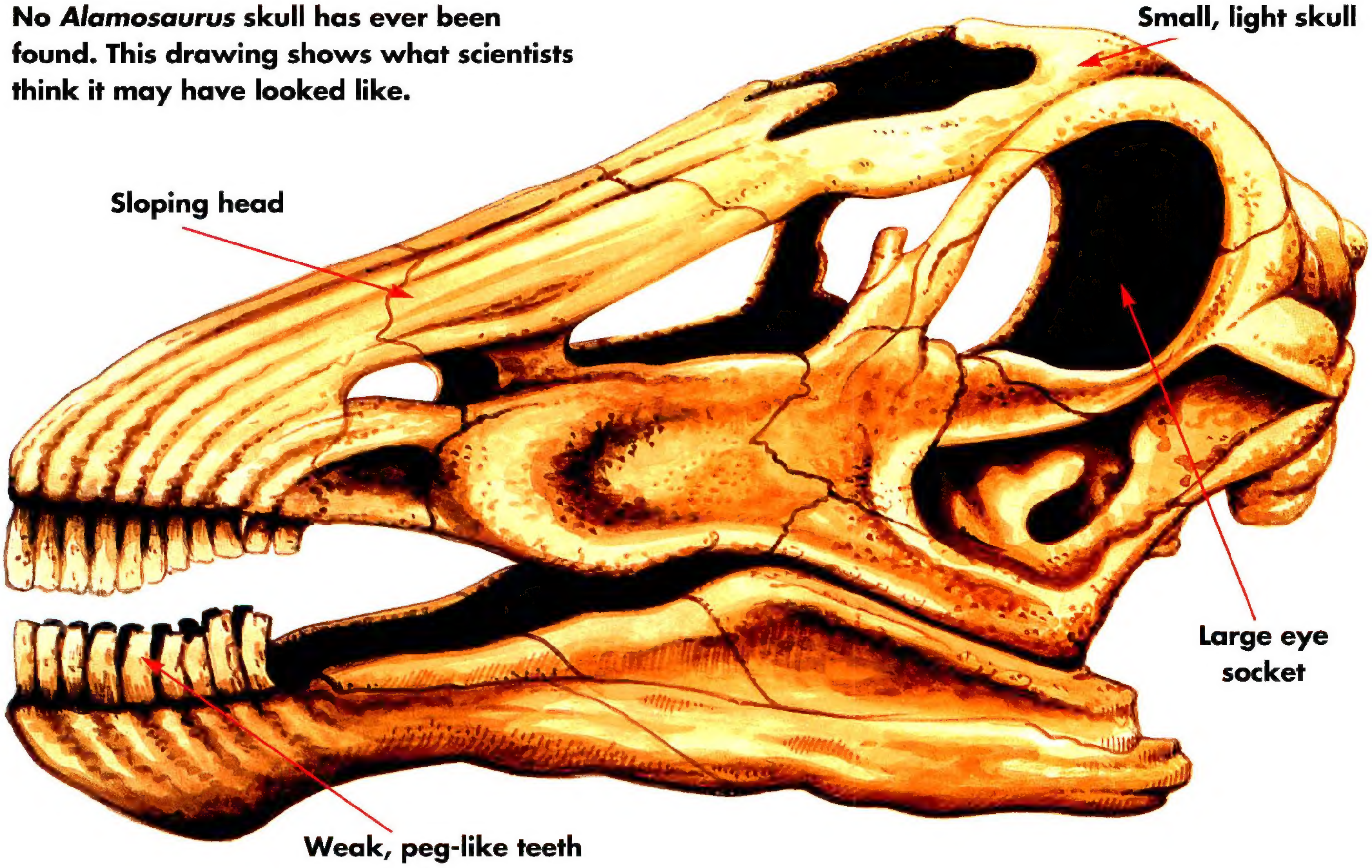
SOLID GROUND

Some animals such as zebras and lions, do not like soggy ground beneath their feet; *Alamosaurus* may also have liked firmer ground. It avoided the swamps of western North America and preferred the drier conditions of the areas now called New Mexico and Utah.

UTAH FOSSILS

The best fossils of this big sauropod have been found in the North Horn mountains of Utah. Experts think that 70 million years ago this area was a large dry plain.

No *Alamosaurus* skull has ever been found. This drawing shows what scientists think it may have looked like.



THICK LEGS

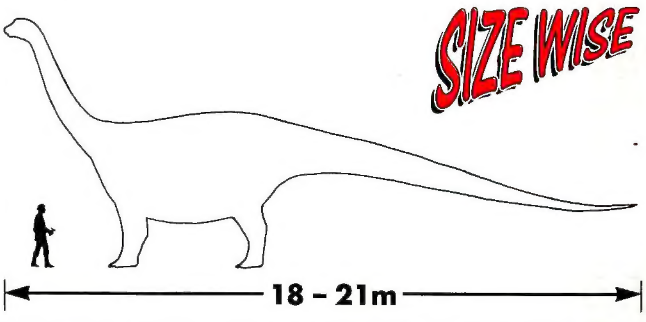
Alamosaurus walked on four thick, powerful legs. These had to be strong to support the great weight of its bulky body. Its feet were broad like an elephant's with short, stubby toes. They provided a wide surface area to spread its weight and helped *Alamosaurus* to keep its balance.

FOOD SUPPLY

For the size of its body *Alamosaurus* had a small head. For many years experts did not understand how it could chew all the food it needed to stay alive with such a little head and weak, peg-like teeth. Then they discovered the answer. *Alamosaurus* probably did not chew its food with its teeth. The dinosaur had a gizzard. It swallowed leaves and twigs whole and relied on the gastroliths (stomach stones) in its gizzard to grind up its food.

MONSTER FACTS

- **NAME:** *Alamosaurus* (al-am-oh-saw-rus) means 'Alamo Reptile' after the Ojo Alamo Mountains of New Mexico where it was found.
- **SIZE:** 18 – 21m long
- **FOOD:** plants
- **LIVED:** about 70 million years ago in the Late Cretaceous Period in Montana, New Mexico, Texas and Utah, USA



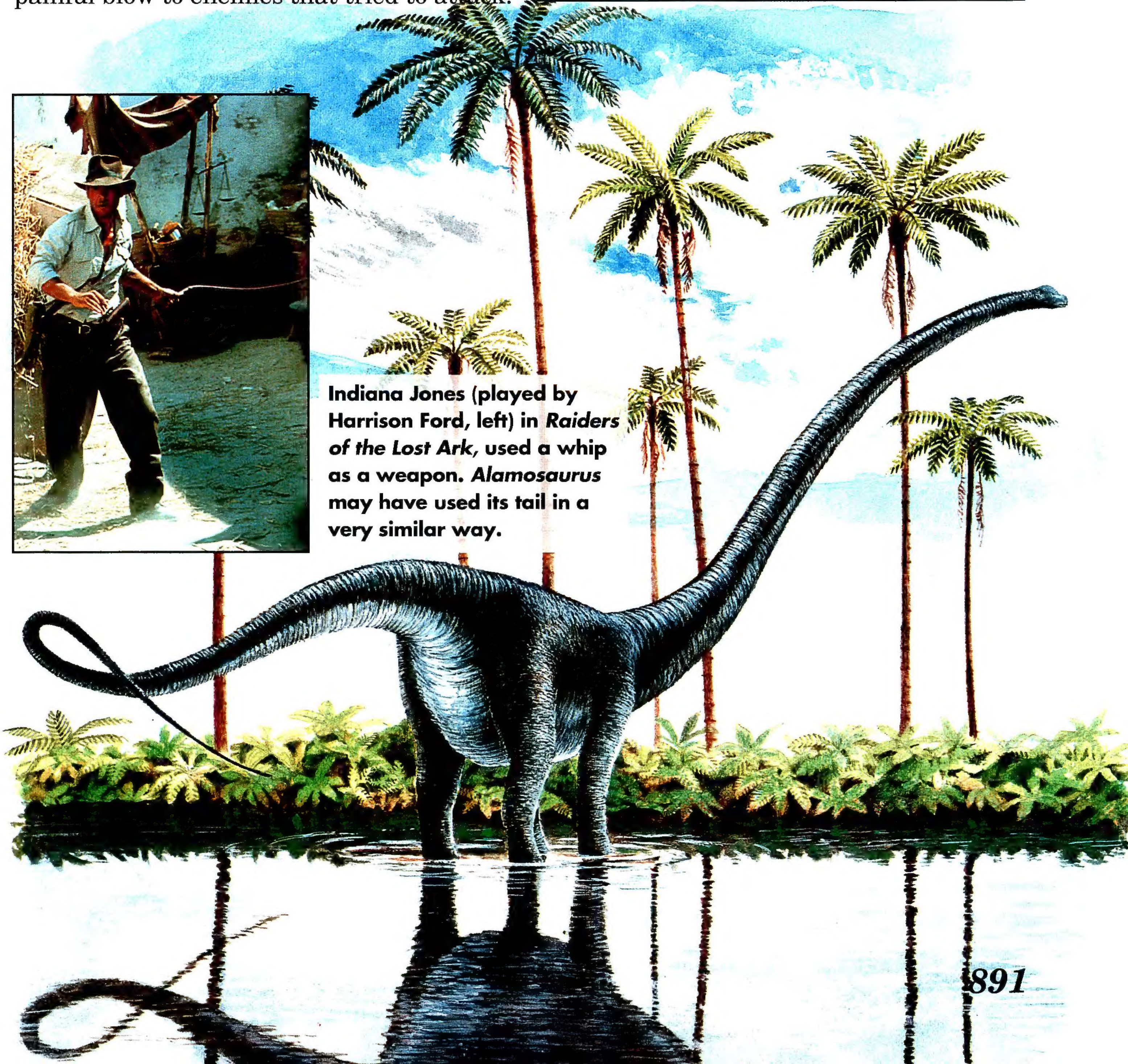
USEFUL TAIL

Alamosaurus had a long, slender tail which was very useful. It may have used its tail as a sort of prop to support itself. It could lean back on its tail while it reared up on its hind legs. This enabled it to reach the higher branches of trees and other tall plants without toppling over backwards or sideways. *Alamosaurus* probably also used its long thin tail as a weapon. It is very likely that it could lash its tail like a long, strong whip. It would have delivered a painful blow to enemies that tried to attack.

What is? A GIZZARD

A gizzard is part of the digestive system of birds and crocodiles. It is found next to the stomach. Shaped like a bag, it contains grit which the bird swallows on purpose. The walls of the gizzard have strong muscles. The bird swallows food which makes its way to the gizzard. Muscles move the gizzard making the stones grind the food in it, as a coffee grinder or food blender does. This is how the gizzard makes food easier to digest.

Indiana Jones (played by Harrison Ford, left) in *Raiders of the Lost Ark*, used a whip as a weapon. *Alamosaurus* may have used its tail in a very similar way.



THESCELOSAURUS

Nifty *Thescelosaurus* roamed the Earth at the end of the Age of the Dinosaurs.

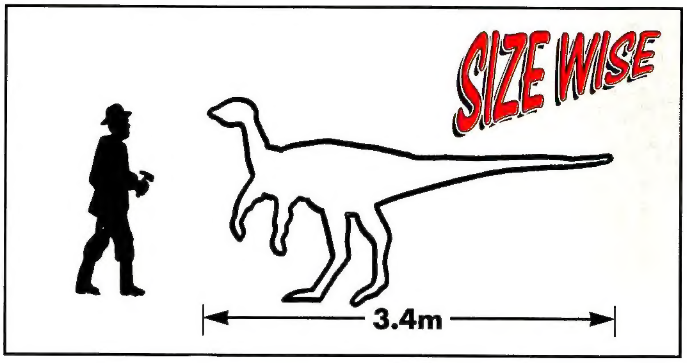
Standing on its hind legs, *Thescelosaurus* was taller than an adult human, and as long as a hippopotamus. With its small head and long stiffened tail it looked like a plump version of agile *Hypsilophodon*.

DISTANT RELATIVES

Thescelosaurus is only known from some skulls and pieces of skeleton. It may be the last of the long line of hypsilophodontids which go right back to the Jurassic Period. Some experts think that it was more like *Iguanodon*. Others have even put it in a family of its own, the thescelosaurids.

DIAMOND-SHAPED TEETH

Plant-eating *Thescelosaurus* had a narrow beak and small front teeth with which it nipped off juicy shoots. It munched this succulent vegetation, which hardly needed chewing, with diamond-shaped teeth.

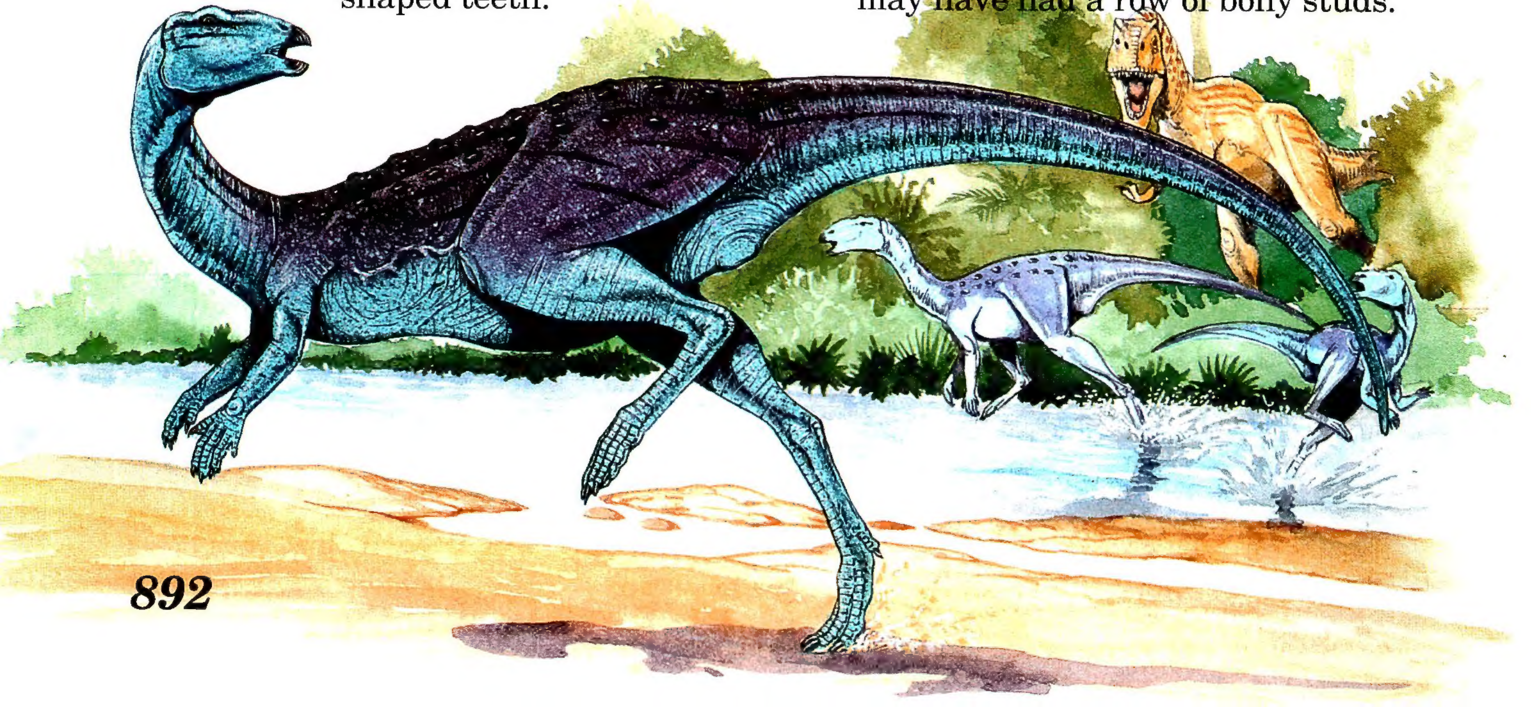


MONSTER FACTS

- **NAME:** *Thescelosaurus* (thes-kel-oh-saw-rus) means 'beautiful reptile'
- **SIZE:** 3.4m long
- **FOOD:** plants
- **LIVED:** about 65 million years ago in the Late Cretaceous Period in Alberta, Canada and in Montana and Wyoming, USA

BONY BACK

Thescelosaurus had four long toes on its feet which ended with hoof-like claws. Its arms were shorter than its legs. Its back may have had a row of bony studs.



ACROCANTHOSAURUS

Deadly *Acrocanthosaurus* made short work of its unsuspecting victims.

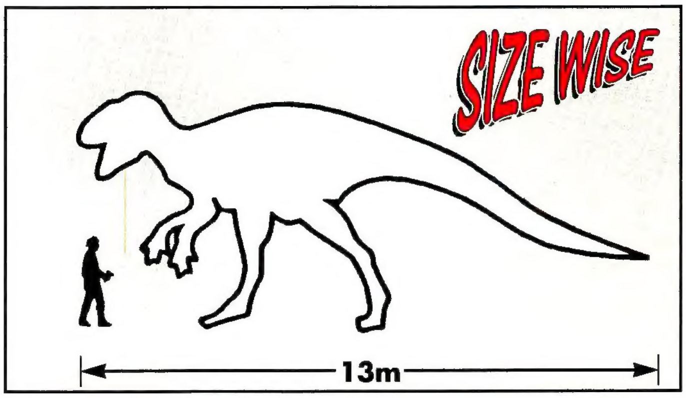
Can you imagine fearsome *Allosaurus* with a fin running along its neck, back and tail? If so, then you will have a good idea of what unusual *Acrocanthosaurus* looked like.

LOW SPINES

Acrocanthosaurus had spines stretching from its skull to halfway down its tail. These were probably between 35 and 50cm high and formed a ridged back sail. The sail varied in height but was nowhere near as tall as *Spinosaurus*' man-sized sail.

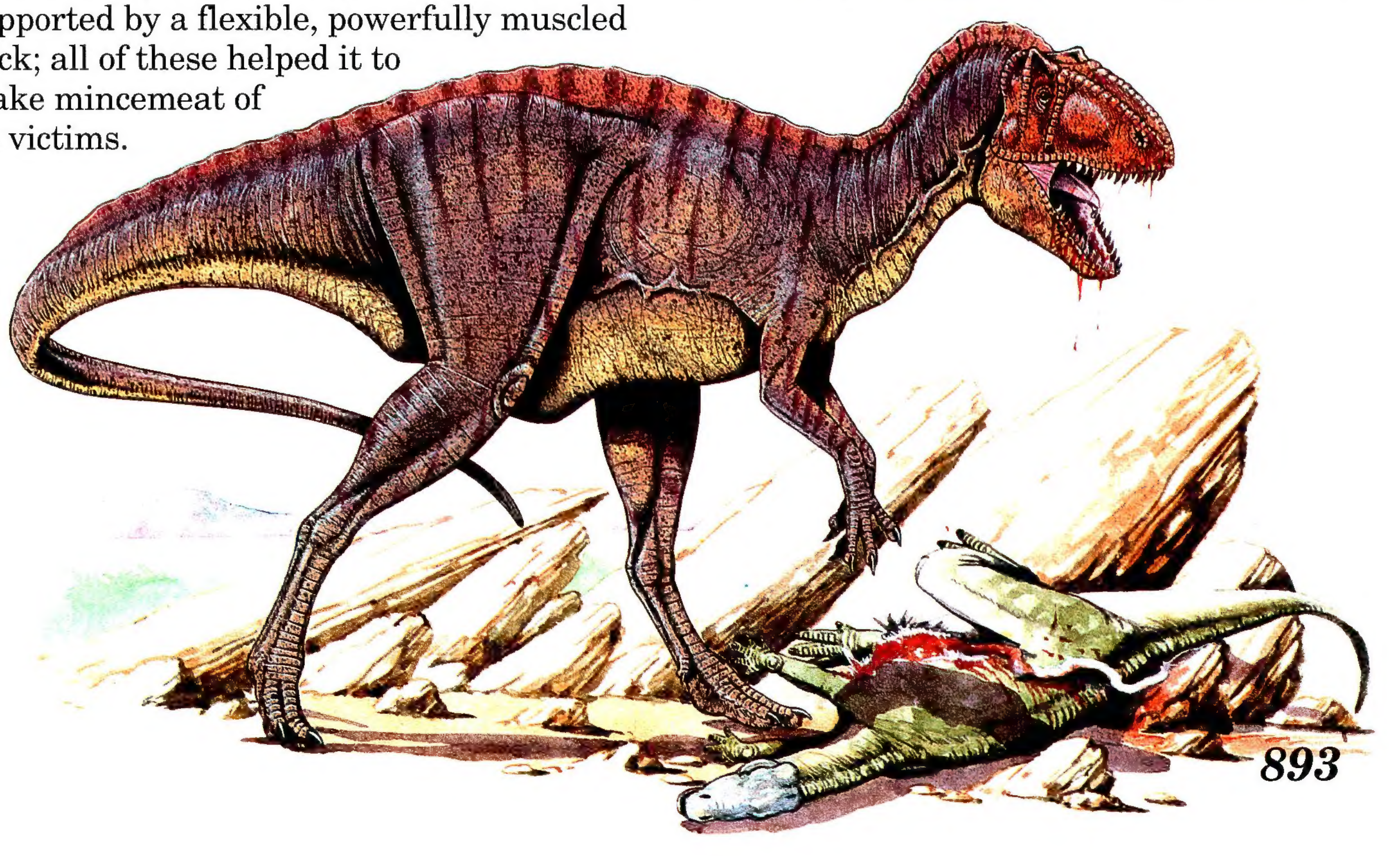
DEADLY AMBUSH

Acrocanthosaurus did not chase after more nimble dinosaurs. It just ambushed them. Its massive jaws and large teeth were supported by a flexible, powerfully muscled neck; all of these helped it to make mincemeat of its victims.



MONSTER FACTS

- **NAME:** *Acrocanthosaurus* (ak-ro-kan-tho-saw-rus) means 'high-spined reptile'
- **SIZE:** 13m long
- **FOOD:** meat
- **LIVED:** about 120 million years ago in the Early Cretaceous Period in Atoka County, Oklahoma and Texas, USA



South American dinosaurs

The earliest known dinosaurs all come from the continent of South America.

South America is a huge continent almost surrounded by sea, with only a thin strip of land joining it to North America. Today its landscape is amazingly varied, and includes rainforests, grasslands, mountains and desert.

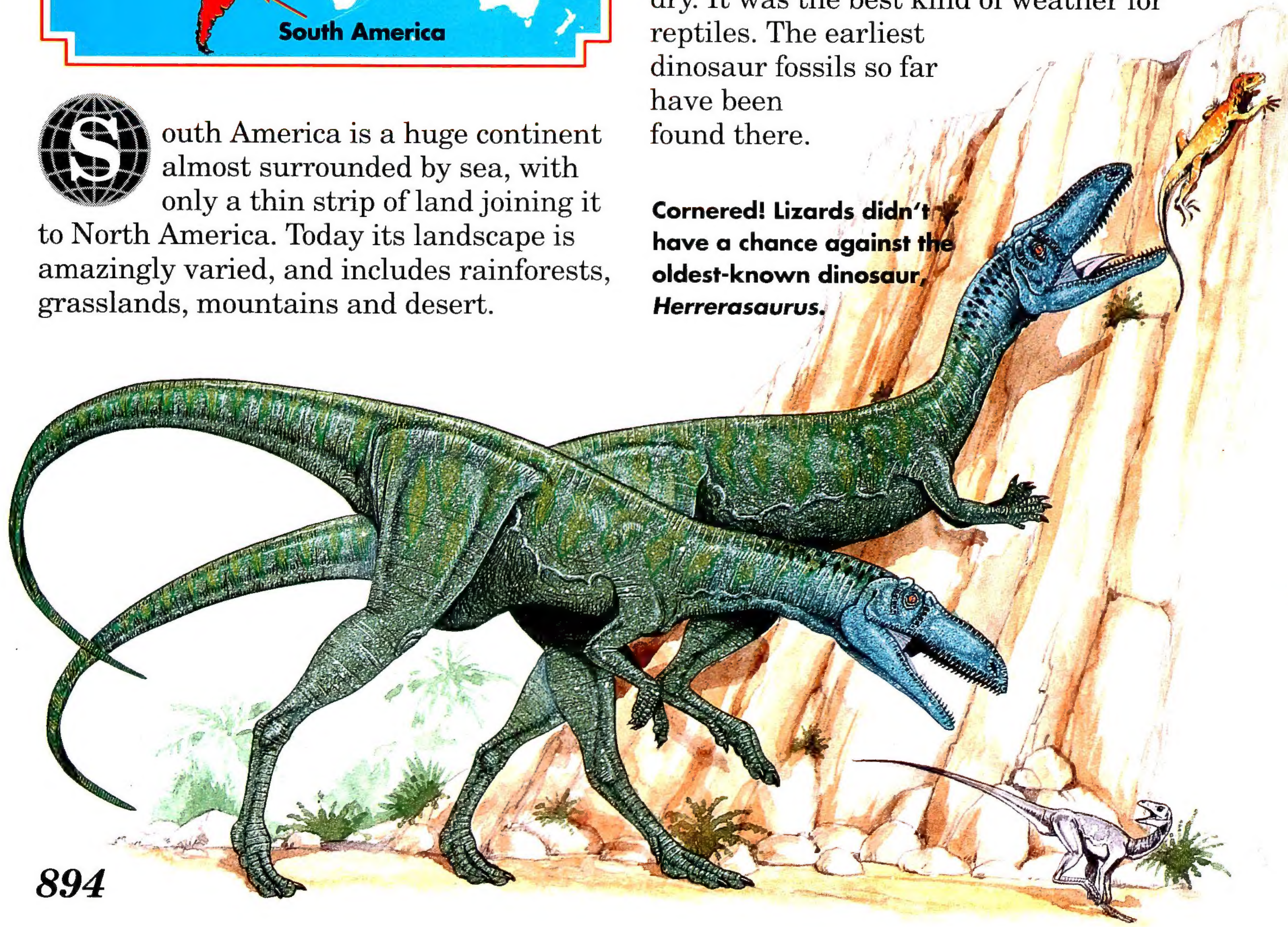
Is it true that all dinosaurs are descended from *Herrerasaurus*?

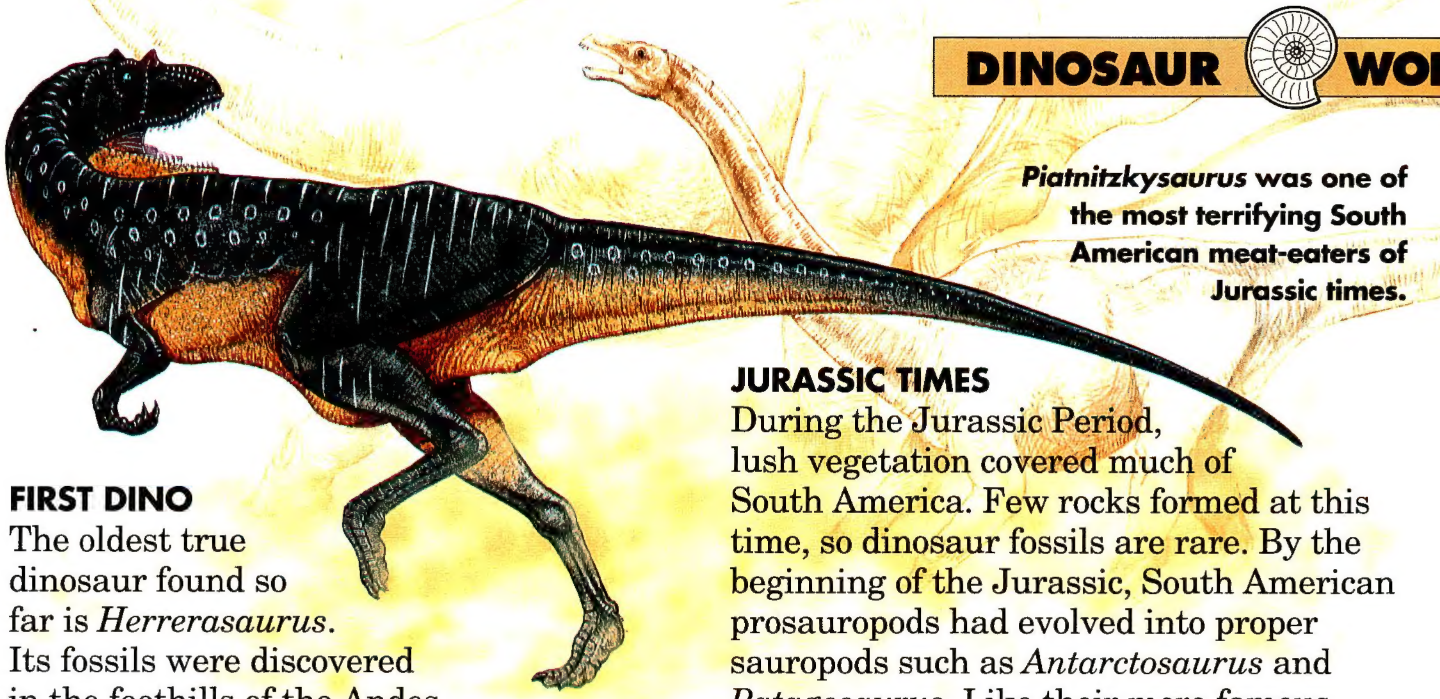
This is unlikely. The earliest dinosaurs were probably rather like their pre-dinosaur ancestors, not very highly developed and not nearly as well adapted to their surroundings as *Herrerasaurus*. Imagine the dinosaur tree of evolution. The very first dinosaurs were at the base of the tree trunk. We have not yet found their fossils. *Herrerasaurus* was probably the end twig of an early, low branch.

DINOSAUR BEGINNINGS

At the dawn of the Age of the Dinosaurs, South America was not so isolated. It was joined to North America, Africa and Antarctica, as part of Pangaea, the supercontinent. During the Triassic the climate in South America was warm and dry. It was the best kind of weather for reptiles. The earliest dinosaur fossils so far have been found there.

Cornered! Lizards didn't have a chance against the oldest-known dinosaur, *Herrerasaurus*.





***Piatnitzkysaurus* was one of the most terrifying South American meat-eaters of Jurassic times.**

FIRST DINO

The oldest true dinosaur found so far is *Herrerasaurus*. Its fossils were discovered in the foothills of the Andes Mountains. *Herrerasaurus* was 2.5m tall, slim and agile, with a bird-like head. It grabbed its prey between the clawed fingers and thumb on its hand. It probably ate small reptiles such as lizards.

LEGS UNDER BODY

How do we know *Herrerasaurus* was a dinosaur? Its leg bones fitted on to its hip bones in the typical dinosaur way. So it stood with its legs tucked underneath its body, rather than sprawling out to the sides like a crocodile.

OTHER EARLY DINOSAURS

Other early meat-eaters included *Eoraptor* from Argentina, which lived at the same time as *Herrerasaurus*, and *Staurikosaurus,* which was 2m long, had long back legs, and fed on small reptiles.

PRO-PLANT-EATERS

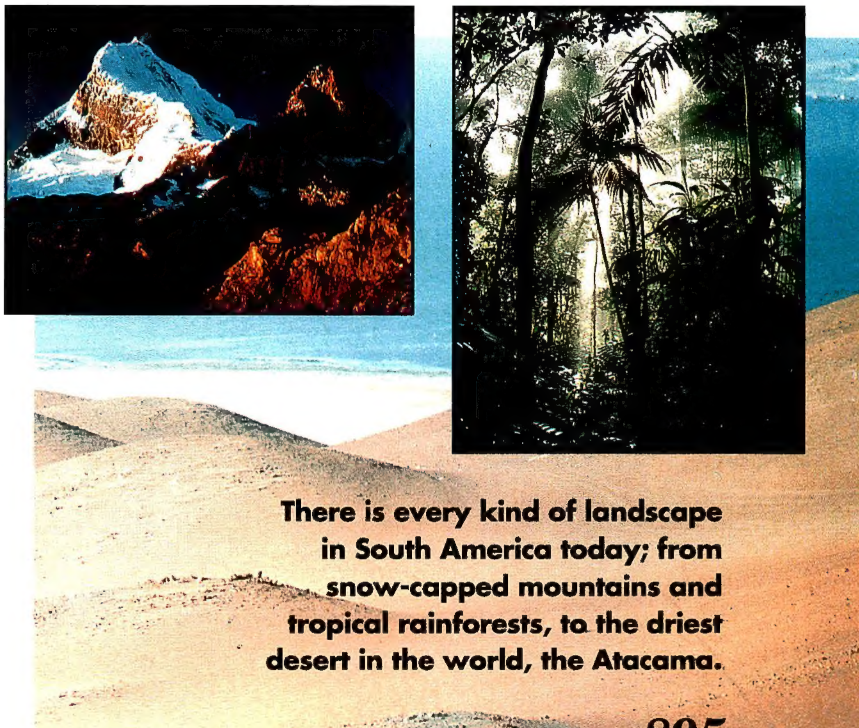
Before the end of the Triassic Period the prosauropods appeared. These dinosaurs had long necks and tails, and could walk on two legs or four. One of these was *Coloradia*, a dinosaur that lived in Patagonia, in the south of South America. A much larger one was *Riojasaurus*. It was 11m long and so heavy that it almost certainly walked on all four legs.

JURASSIC TIMES

During the Jurassic Period, lush vegetation covered much of South America. Few rocks formed at this time, so dinosaur fossils are rare. By the beginning of the Jurassic, South American prosauropods had evolved into proper sauropods such as *Antarctosaurus* and *Patagosaurus*. Like their more famous cousin *Diplodocus*, they were huge animals that grew up to 17m long with tiny heads, long necks, barrel-shaped bodies, tree-stump legs, and long, whiplash tails.

SILLY ARMS?

There were Jurassic meat-eaters in South America, too. One was *Piatnitzkysaurus*. It was very like the better known North American *Allosaurus*. *Piatnitzkysaurus* was about a third of the size of *Allosaurus* and had a huge head, ferocious teeth, strong back legs, and short, feeble arms.



There is every kind of landscape in South America today; from snow-capped mountains and tropical rainforests, to the driest desert in the world, the Atacama.

IT'S A FACT

THAT DINOSAUR EXPERTS CHANGE THEIR MINDS

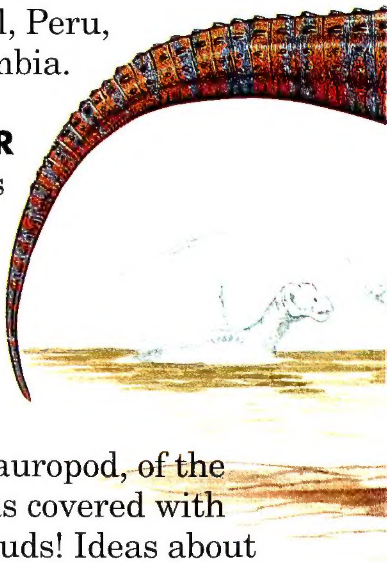
Often what we think of as 'facts' can change. For example, many experts thought that fossils with bony plates and knobs were from ankylosaurs. But the discovery of *Saltasaurus* showed that sauropods could have bony armour, too. So scientists had to re-think their ideas about ankylosaurs and sauropods.

SOUTH AMERICAN SURVIVORS

Dinosaur fossils from South America are not as common as from North America or Europe. This may be partly because people have not been looking there long enough, or in the right places. The fossils found so far are very important. They suggest that all the main groups of dinosaurs lived in South America.

CRETACEOUS DINOSAURS

As the Cretaceous Period began, rising seas turned South America into a huge island, covered by vast dry scrublands and desert. At this time rocks containing fossils were formed. Dinosaur fossils have been found in Argentina, Brazil, Peru, Chile, Uruguay and Colombia.

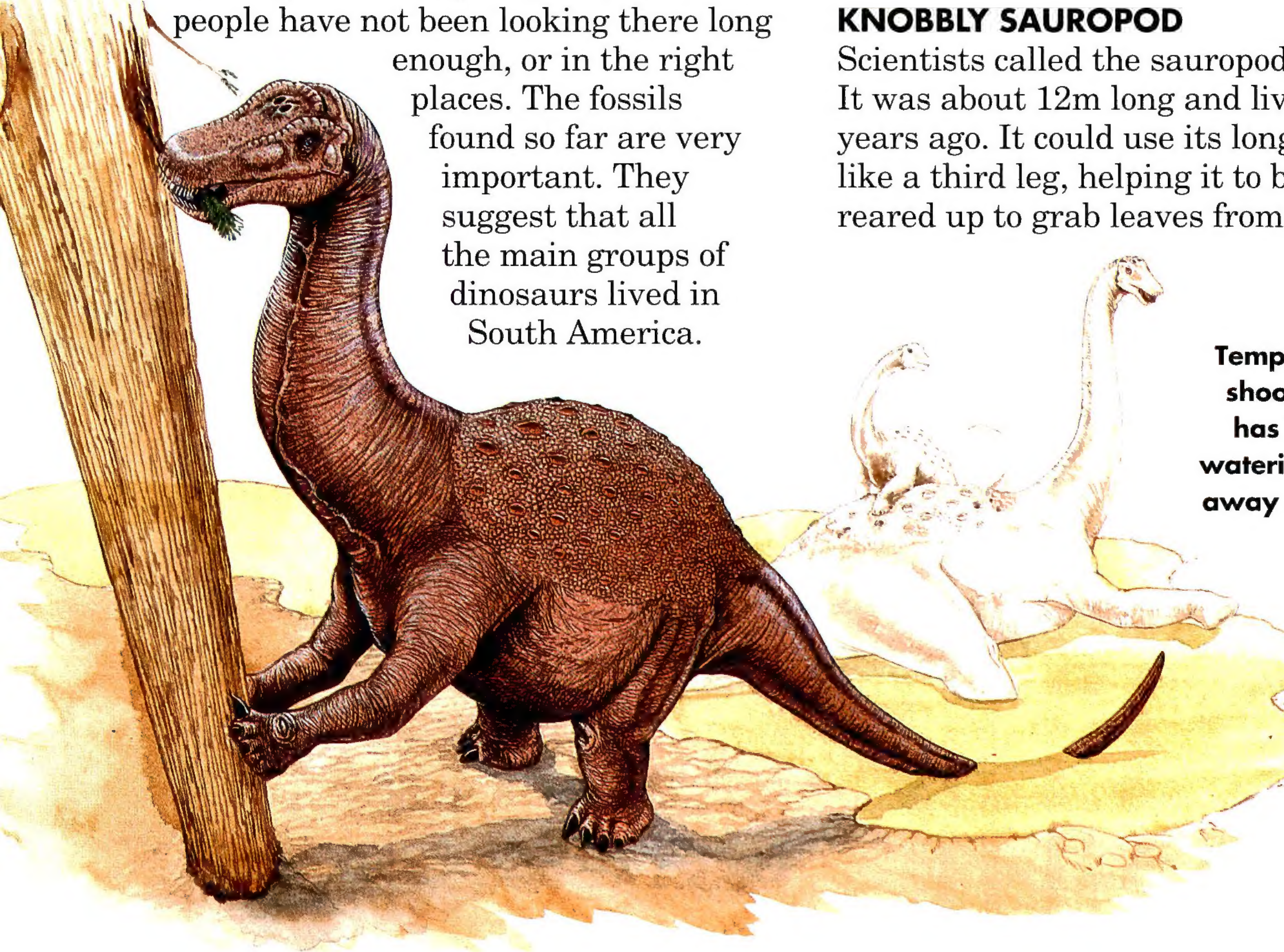


A NEW TYPE OF ARMOUR

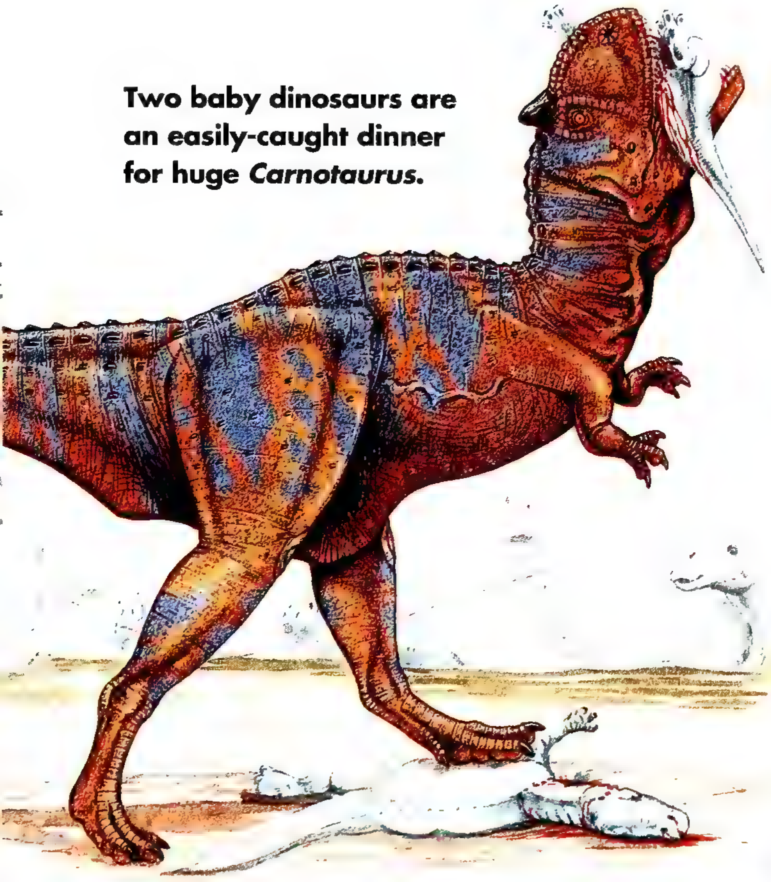
Usually, when bony plates and knobs are found with a dinosaur skeleton, this means it is some kind of ankylosaur. In 1980 a large dinosaur skeleton was found in Argentina. It was definitely a large sauropod, of the *Diplodocus* type. Yet it was covered with rows of bony knobs and studs! Ideas about dinosaur armour had to change.

KNOBBLY SAUROPOD

Scientists called the sauropod *Saltasaurus*. It was about 12m long and lived 70 million years ago. It could use its long, flexible tail like a third leg, helping it to balance it as it reared up to grab leaves from tree-tops.



Tempted by a tasty shoot, *Saltasaurus* has left its muddy watering hole to tug away at the morsel.



Two baby dinosaurs are an easily-caught dinner for huge *Carnotaurus*.

A SWIMMING DUCKBILL?

South America had plenty of members from other dinosaur groups. *Loncosaurus* was a hypsilophodont that lived there during the Cretaceous. These medium-sized plant-eaters had strong back legs, and a small, beak-like mouth with different types of teeth. *Secernosaurus*, from Argentina, was a duckbill. Most other hadrosaurs lived in North America and eastern Asia. *Secernosaurus* may have travelled to South America by swimming along a chain of islands.

MORE JAWS AND CLAWS

Noasaurus was a small theropod dinosaur that lived in Argentina, about 70 million years ago. Its fossil fragments include a jaw with saw-edged teeth and a large toe claw, like *Dromaeosaurus* from North America. A much larger meat-eater, at up to 10m long, was *Carnotaurus*. It seems to have been related to the tyrannosaurs.

STRANGE TYRANNOSAUR

Carnotaurus had a horn over each eye and rows of bony lumps along its body. In proportion to its body, its arms were even smaller than those of *T rex*.

EVOLUTION THEORY

Why were *Carnotaurus*' arms so short? Perhaps it didn't need long arms. Through the ages dinosaurs changed a great deal. If a dinosaur had no use for long arms they would get gradually smaller and smaller as the species evolved. As the fossil-hunters continue to dig, there are bound to be more puzzling and exciting dinosaur discoveries from South America.

Jaguar

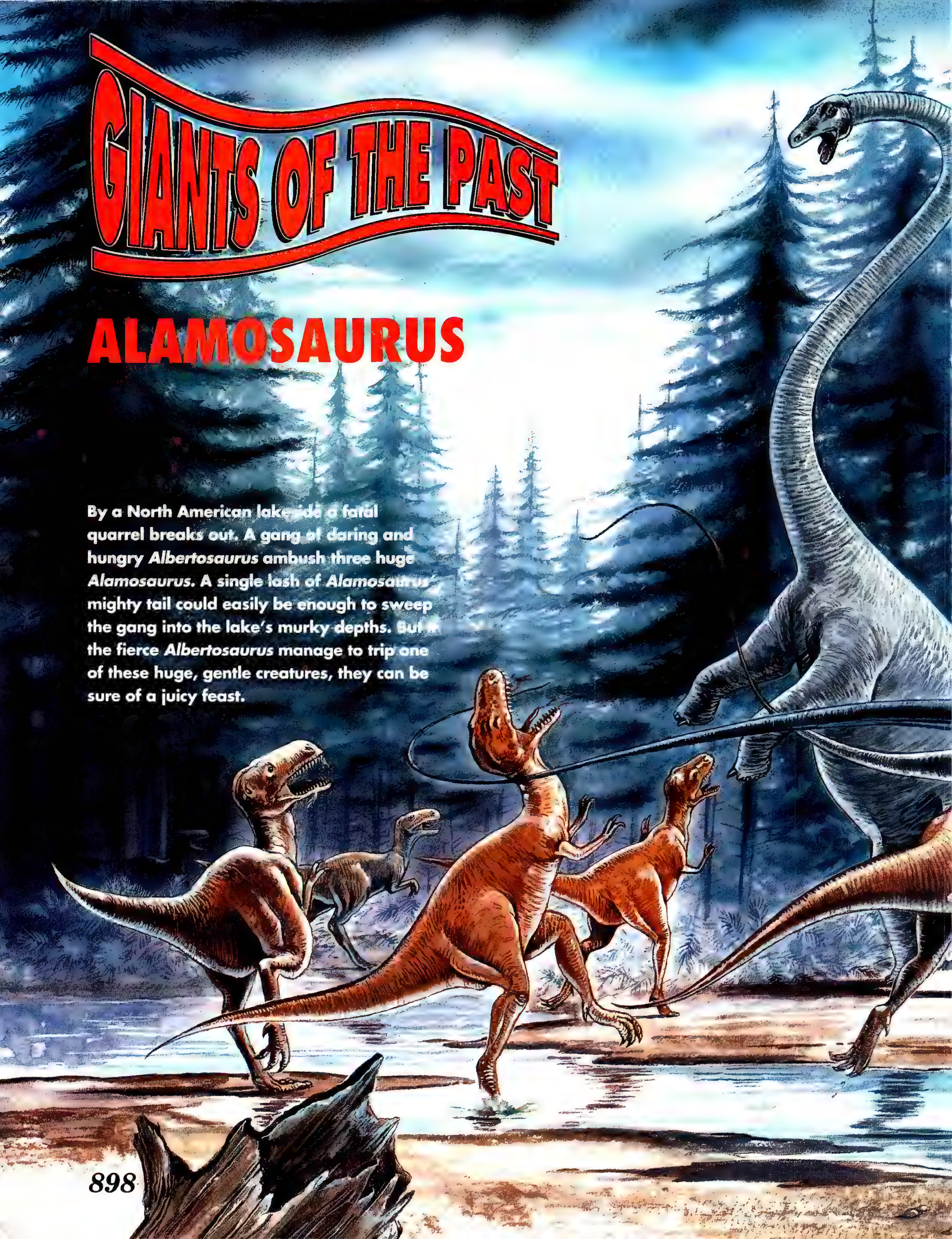
Hummingbird

All sorts of creatures live in South America today. There are probably just as many kinds as in the Age of the Dinosaurs. Deep in the rainforests hummingbirds feed on the nectar of the many colourful flowers and shy tapirs wander through the swamps, all the time steering clear of their main predator, the fearsome jaguar.

Tapir

GIANTS OF THE PAST

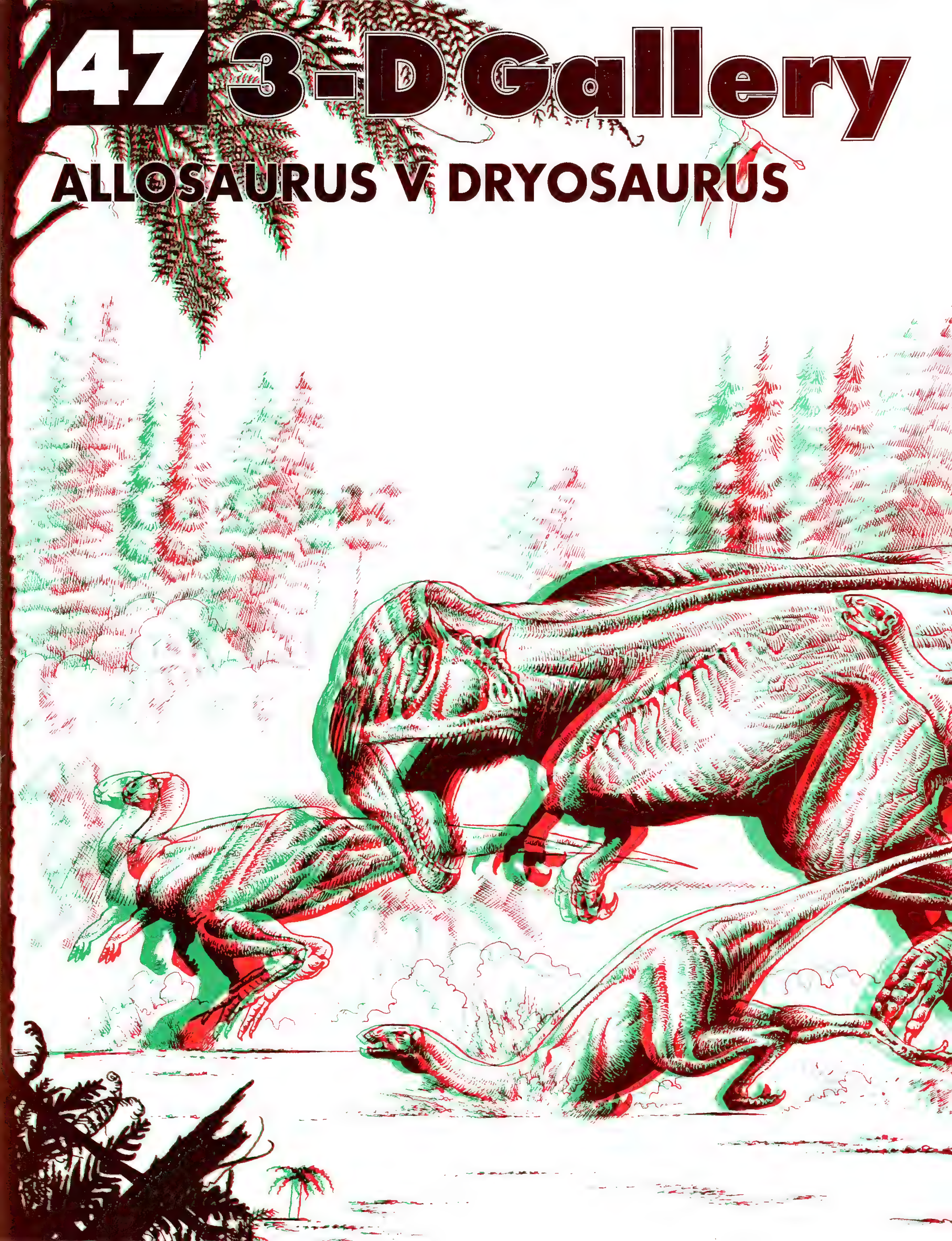
ALAMOSAURUS



By a North American lakeside a fatal quarrel breaks out. A gang of daring and hungry *Albertosaurus* ambush three huge *Alamosaurus*. A single lash of *Alamosaurus'* mighty tail could easily be enough to sweep the gang into the lake's murky depths. But if the fierce *Albertosaurus* manage to trip one of these huge, gentle creatures, they can be sure of a juicy feast.

3-D Gallery

ALLOSAURUS V DRYOSAURUS



Starving flesh-eating *Allosaurus* are on the rampage again! Plant-eating *Dryosaurus* don't have a chance. Desperately they try to splash across the lake to safety. They know that if it comes to a fight they have no defence against *Allosaurus*' gaping tooth-lined jaws.

Nests

What did dinosaur nests look like and how were they built?

Like *Maiasaura* some modern reptiles build nest mounds. This crocodile (left) is keeping watch.

Right: some birds, like this mallee fowl from Australia, also build nest mounds.

Scientists learnt a lot about nests and how dinosaurs looked after their young from the nests of *Maiasaura* and *Protoceratops*.

COLONIES IN THE HILLS

Maiasaura laid its eggs in nests in dry, hilly areas, where they would be safe from flooding. From the hills the dinosaurs were able to watch out for predators. *Maiasaura* always nested in large colonies. This was because a predator was unlikely to attack lots of *Maiasaura* together.

MAKING THE NEST

First *Maiasaura* dug a bowl-shaped hole in the ground. It used mud and stones to strengthen the walls and lined the bottom with plants. The nests were spaced one dinosaur length apart, so the mothers could get in and out easily to feed their young.

NESTING INSTINCT

Some dinosaurs laid their eggs in sand. *Protoceratops* scooped a hollow in the sand and then laid its eggs in neat circles, turning as it went. Even if it had never built a nest before it knew how to do this by instinct. Instinct is behaviour that is inborn to help animals in their struggle for survival.

LATEST EVIDENCE!

Some experts thought that dinosaurs sat on their eggs to incubate them (keep them warm). While some birds and reptiles keep their eggs warm by sitting on them, the latest evidence shows that dinosaurs did not sit on their eggs. They would simply have been too heavy. In comparison to an adult dinosaur its eggs were very small. The eggs would have broken under the mother's weight. So how did mother dinosaurs keep their eggs warm?

WHAT ROT!

Once they laid their eggs, female dinosaurs such as *Maiasaura* probably covered their nests with a mound of vegetation. When plants decay they produce heat. So the eggs in the nest would have been kept warm by the constant rotting of the vegetation around them.

LIKE CROCODILES

The female crocodile behaves in a similar way to *Maiasaura*. She digs a pit on a sandy river bank and then builds a mound of vegetation on top of her eggs to incubate them. She guards the nest for 6-14 weeks, waiting for a sound from inside the eggs. This will tell her that the babies are ready to hatch. Perhaps dinosaur hatchlings called their mothers from their eggs, just like crocodiles.

It's hatching time! *Maiasaura* removes bits of vegetation from her nest mound. This will make it easier for her baby dinosaurs to hatch out.

Loony theories

Dinosaurs ruled the Earth for about 160 million years. But then, quite suddenly, they all died out. Why? Some of the theories are plain silly.

Maybe dinosaurs were whisked away on flying saucers? Some people still believe this!

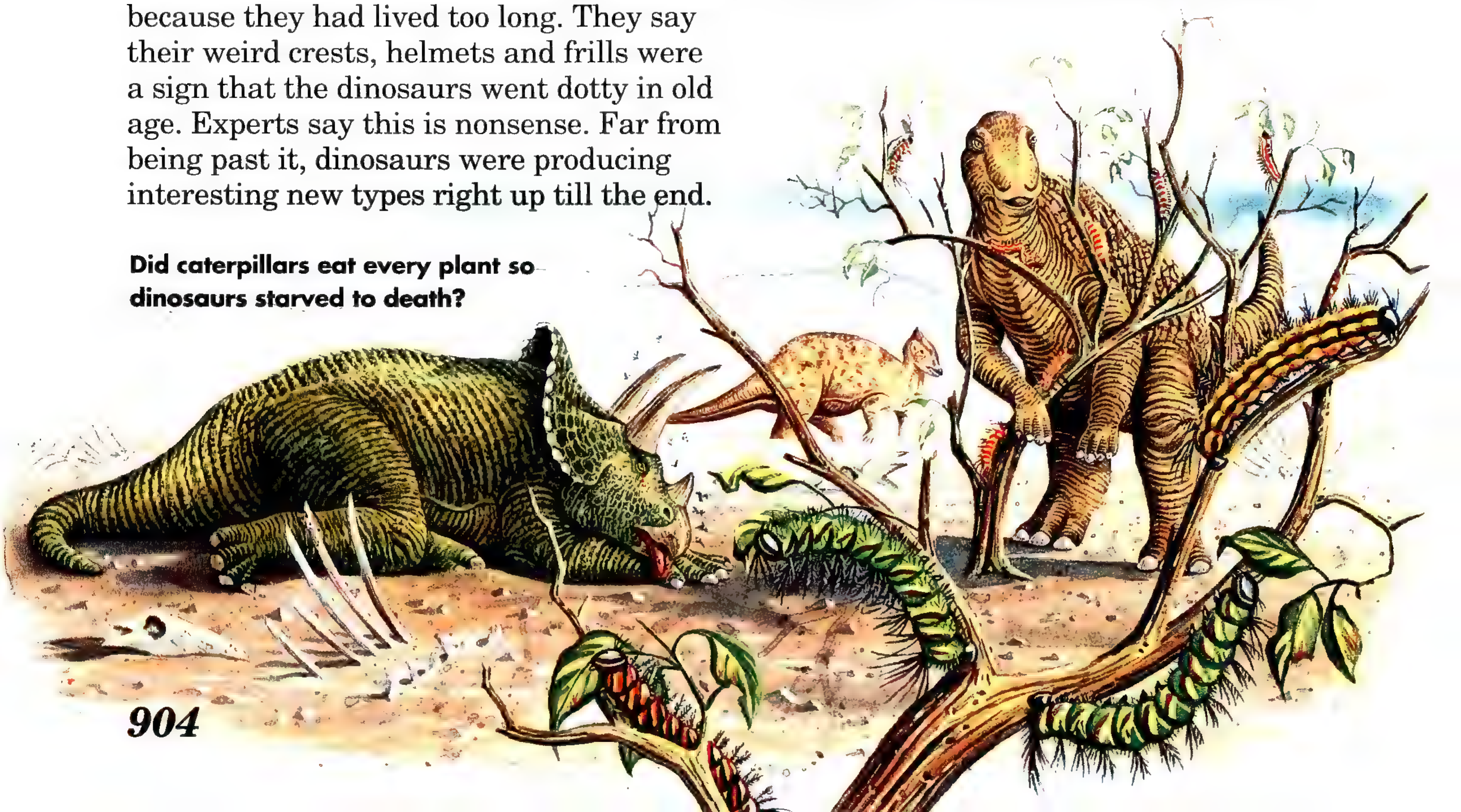
The great mystery of whatever happened to the dinosaurs has never been solved. Scientists believe they probably died out at the same time everywhere in the world. But no one knows why. Some of the solutions seem sensible, but many, like the ones listed here, are quite loony.

PAST IT

Some people believe the dinosaurs died out because they had lived too long. They say their weird crests, helmets and frills were a sign that the dinosaurs went dotty in old age. Experts say this is nonsense. Far from being past it, dinosaurs were producing interesting new types right up till the end.

THE CATERPILLAR KILLERS

Perhaps a plague of caterpillars was responsible for the death of the dinosaurs? Large numbers of caterpillars can strip huge areas of vegetation. Plant-eating dinosaurs would have starved to death.



Did caterpillars eat every plant so dinosaurs starved to death?

DEAD MEAT

Meat-eating dinosaurs would have died, too, with no plant-eaters to feed on. Scientists say this is much too far-fetched. Enormous numbers of caterpillars would be needed to strip the earth of its vegetation. There is no evidence to show there were that many.

BIG IS BAD

It has been suggested that the dinosaurs grew too large for their own good. Some people say they were too awkwardly constructed to survive. They claim dinosaurs got slipped discs and starved to death, because they couldn't move.

When birds are stressed they lay eggs with thin shells, like these battery hens. Perhaps dinosaurs were also stressed because they were overcrowded. They may have laid thin-shelled eggs too. The embryos inside wouldn't have developed properly. Whole species of dinosaurs may have died out.

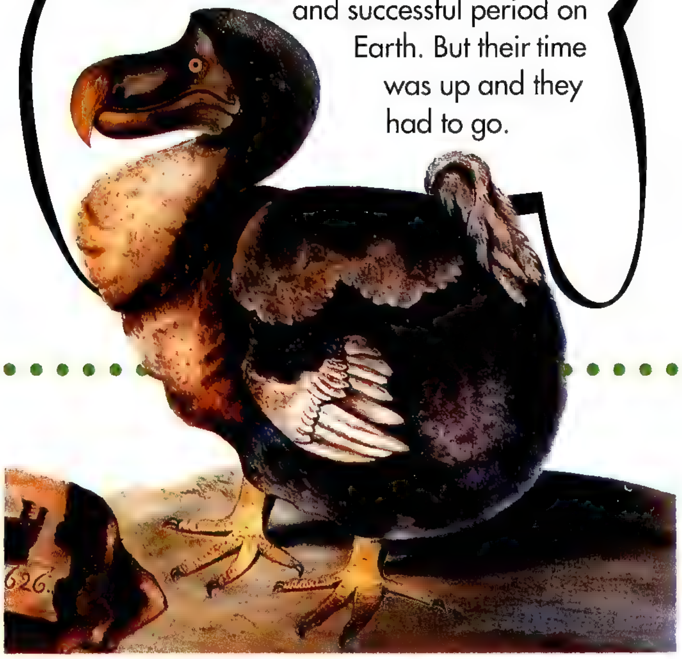
TOO HOT

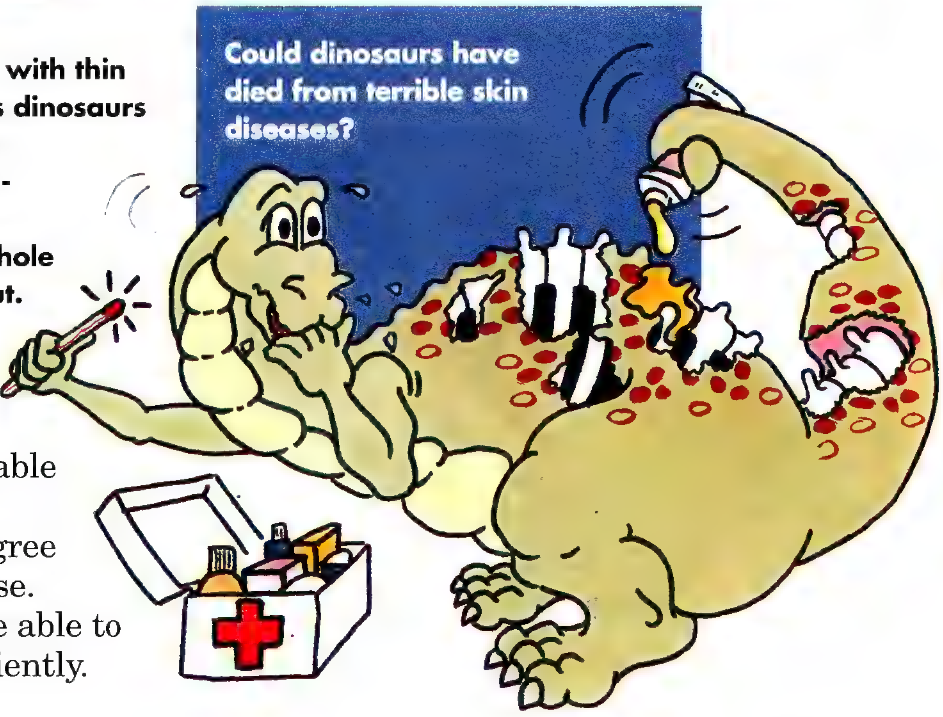
Because they were so big some people believe dinosaurs were unable to cool off in hot weather. So they simply boiled to death. Experts agree that the 'too big' theory is nonsense. They believe large dinosaurs were able to control their body heat quite efficiently.

IT'S A FACT

DINOSAURS ARE NOT FOREVER

At least 99 per cent of all species that ever lived are now extinct. The dodo (below) is one of the most famous extinct animals. Scientists say dinos were no different from the others. They had a long and successful period on Earth. But their time was up and they had to go.





Could dinosaurs have died from terrible skin diseases?

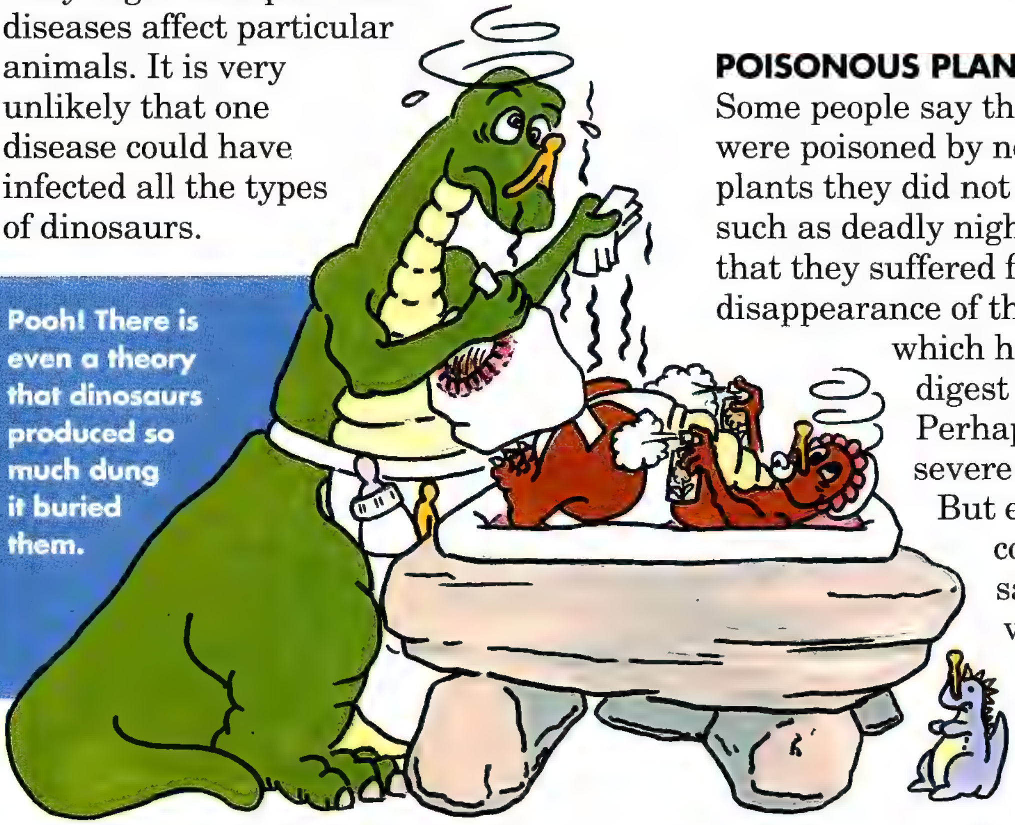
TOO STUPID TO SURVIVE?

Were the dinosaurs the victims of their tiny brains? At the beginning of this century, Louis Dollo was one of the first experts to single out the dinosaurs' small brains as a possible reason why they became extinct. Scientists then believed that dinosaurs were not brainy enough to survive. Experts now disagree. They point out that turtles and crocodiles, which had brains no bigger, were able to survive when the dinosaurs died out. Also, some of the last dinosaurs, such as the troodontids, had much bigger brains.

DEATH BY DISEASE

Perhaps the dinosaurs were the victims of disease. It has been suggested that they may have been hit by a killer plague. Many scientists are not convinced. They argue that particular diseases affect particular animals. It is very unlikely that one disease could have infected all the types of dinosaurs.

Pooh! There is even a theory that dinosaurs produced so much dung it buried them.



It has been suggested that some mammals fed on dinosaur eggs and ate so many they wiped out the dinosaurs. But experts agree it is very unlikely that egg thieves alone could have destroyed the dinosaurs.

POISONOUS PLANTS

Some people say the dinosaurs were poisoned by new killer plants they did not recognise, such as deadly nightshade. Or that they suffered from the disappearance of the ferns which helped them digest their food. Perhaps they died of severe constipation! But experts aren't convinced. They say the dinosaurs had very efficient digestive systems. Also, there weren't many new poisonous plants in the Late Cretaceous.

NOT ALONE

It wasn't just dinosaurs that died out 66 million years ago. The swimming and flying reptiles disappeared too. But other animals survived. Why? Any explanation for the death of dinosaurs must solve this puzzle as well.

What is? OZONE

Some scientists believe dinosaurs died out because of the destruction of the ozone layer. Ozone is a gas which occurs naturally in the atmosphere over the Earth. It is important for all creatures on Earth because it absorbs ultraviolet rays. These are harmful to living things. If we want to look after our world we must protect the ozone layer by cutting down on pollution.

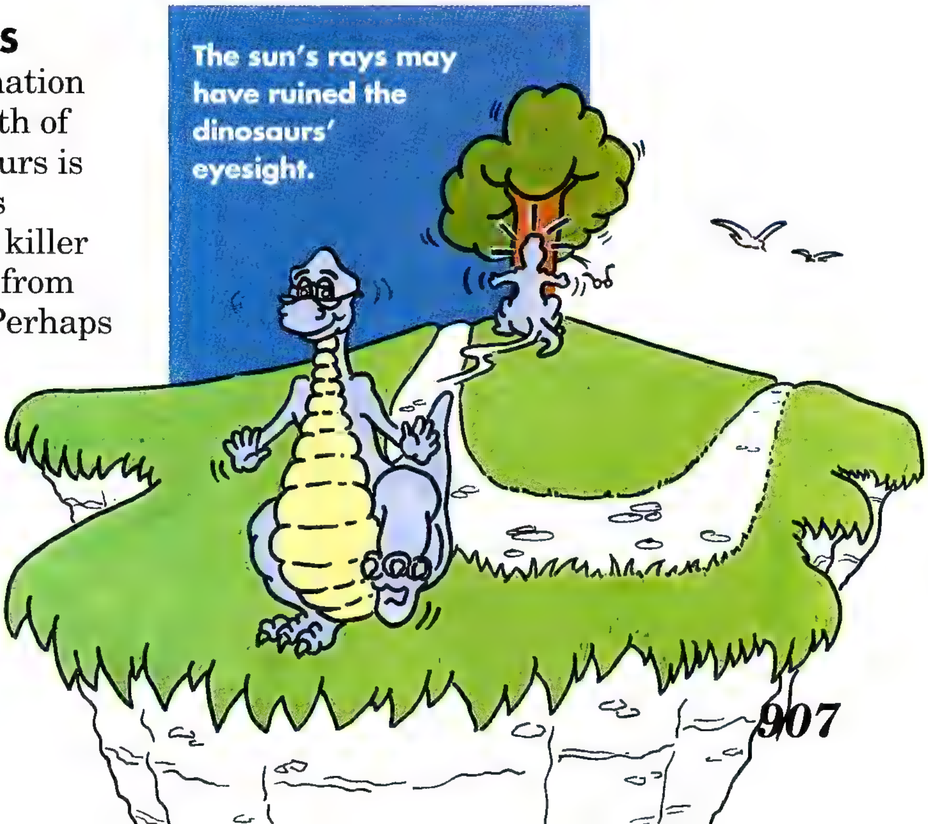
Left: did dinosaurs die out from eating poisonous plants like deadly nightshade?

KILLER RAYS

One explanation for the death of the dinosaurs is that it was caused by killer radiation from the sun. Perhaps the Earth lost its protective ozone layer because of the powerful gases produced by erupting volcanoes? The dinosaurs could have caught radiation sickness; or they might have been blinded by the rays and, unable to find food, starved to death.

SENSIBLE REASONS

Although no one knows for certain why the dinosaurs died out, some very sensible and scientific theories have been given. The death of the dinosaurs is one of the great mysteries of life on Earth. Scientists are still working to understand it.



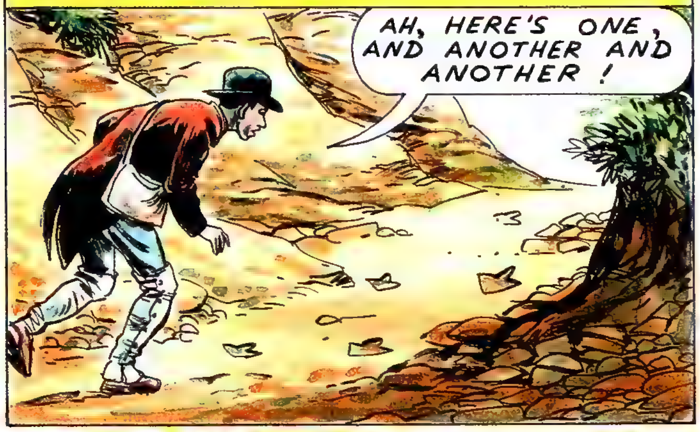
The sun's rays may have ruined the dinosaurs' eyesight.

THE MYSTERY OF THE GIANT BIRDS

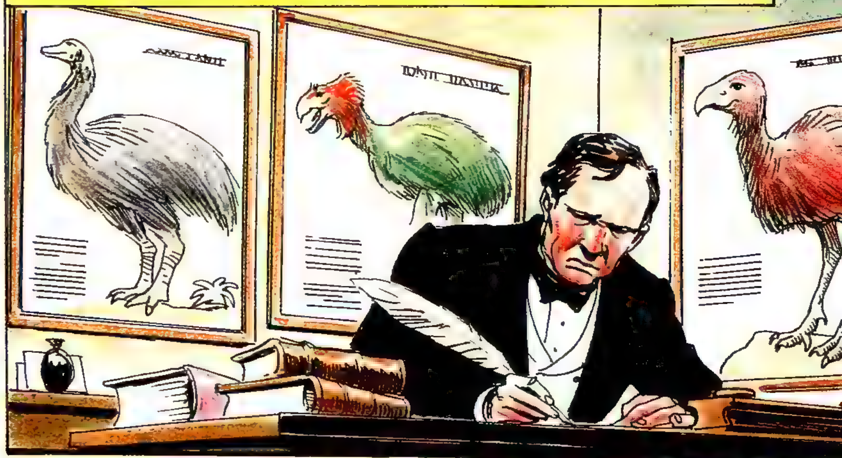
AS STUDENT PLINY MOODY PLOUGHED HIS FATHER'S FIELD ONE DAY IN 1802, HIS PLOUGH TURNED UP A SLAB OF SANDSTONE.

GEE! WHAT ON EARTH IS THAT?

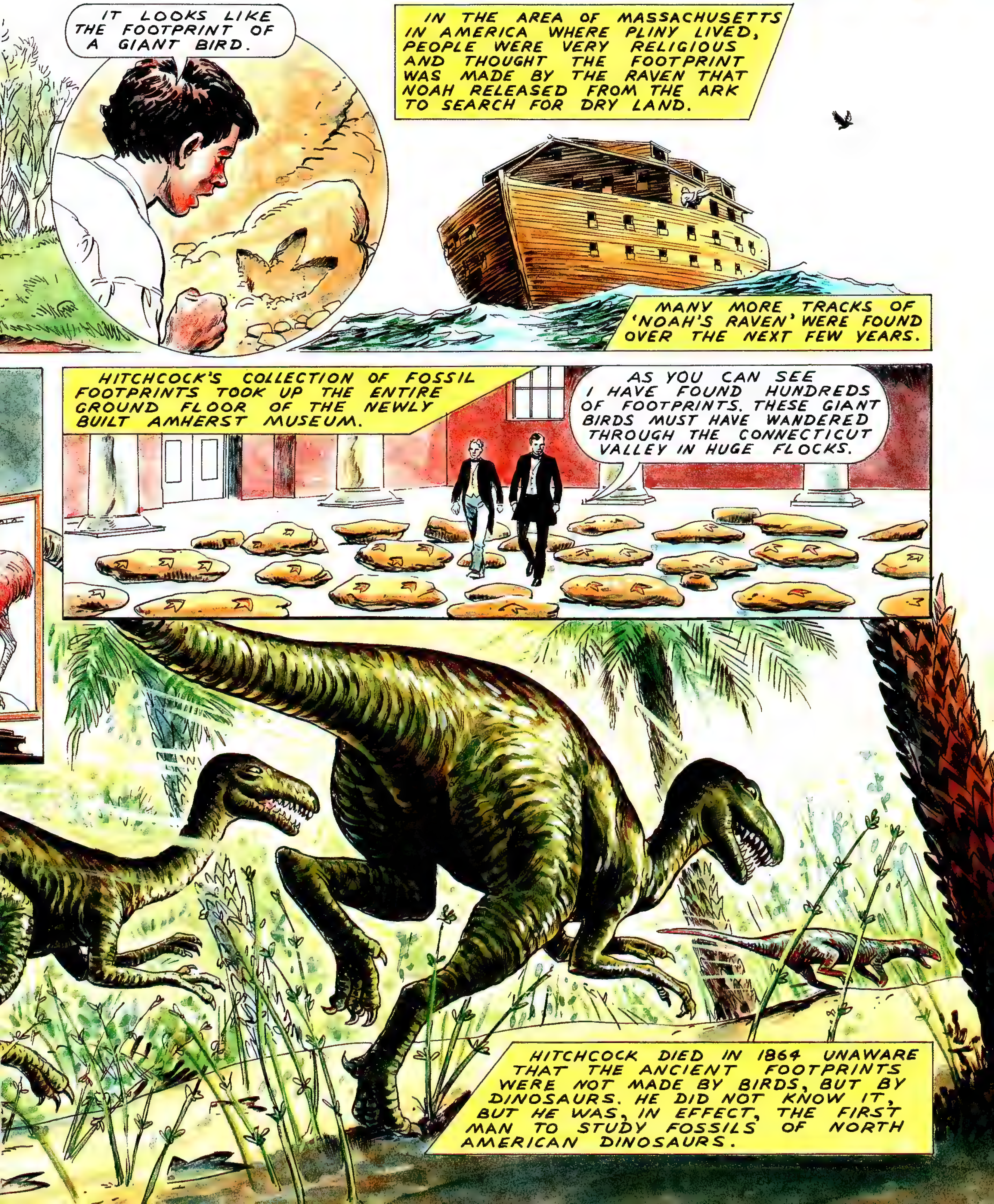
THE EMINENT GEOLOGIST EDWARD B. HITCHCOCK BECAME FASCINATED BY THE MASSIVE BIRD TRACKS. HE SPENT ALL HIS SPARE TIME SEARCHING FOR THEM IN THE VALLEY OF THE CONNECTICUT RIVER THAT RAN THROUGH MASSACHUSETTS AND CONNECTICUT.


AH, HERE'S ONE, AND ANOTHER AND ANOTHER!

PROFESSOR HITCHCOCK WAS CONVINCED THAT THE FOOTPRINTS WERE LEFT NOT BY NOAH'S RAVEN, BUT BY GIANT BIRDS 4 OR 5m HIGH THAT WANDERED THROUGH THE LUSH LANDSCAPE OF TRIASSIC MASSACHUSETTS. HE PUBLISHED SEVERAL SCIENTIFIC PAPERS AND BOOKS ON THE SUBJECT.



ALL THROUGH HIS LIFE HITCHCOCK CONTINUED HIS WORK ON THE CONNECTICUT VALLEY FOSSIL FOOTPRINTS. HE WAS SO DEDICATED THAT HE VENTURED OUT IN APPALLING WEATHER EVEN WHEN HE GREW FRAIL.


IT LOOKS LIKE THE FOOTPRINT OF A GIANT BIRD.
IN THE AREA OF MASSACHUSETTS IN AMERICA WHERE PLINY LIVED, PEOPLE WERE VERY RELIGIOUS AND THOUGHT THE FOOTPRINT WAS MADE BY THE RAVEN THAT NOAH RELEASED FROM THE ARK TO SEARCH FOR DRY LAND.
MANY MORE TRACKS OF 'NOAH'S RAVEN' WERE FOUND OVER THE NEXT FEW YEARS.
HITCHCOCK'S COLLECTION OF FOSSIL FOOTPRINTS TOOK UP THE ENTIRE GROUND FLOOR OF THE NEWLY BUILT AMHERST MUSEUM.
AS YOU CAN SEE I HAVE FOUND HUNDREDS OF FOOTPRINTS. THESE GIANT BIRDS MUST HAVE WANDERED THROUGH THE CONNECTICUT VALLEY IN HUGE FLOCKS.
HITCHCOCK DIED IN 1864 UNAWARE THAT THE ANCIENT FOOTPRINTS WERE NOT MADE BY BIRDS, BUT BY DINOSAURS. HE DID NOT KNOW IT, BUT HE WAS, IN EFFECT, THE FIRST MAN TO STUDY FOSSILS OF NORTH AMERICAN DINOSAURS.

Improve and test your knowledge with...

DINO Fact File

Follow the footprints to complete the quiz and get to the bottom of the question!

1 *Alamosaurus* lived:
a) on dry land
b) in swamps
c) in the sea

2 *Thescelosaurus* had teeth shaped like:
a) pegs
b) diamonds
c) knives

Latin fossil

The word fossil comes from the Latin word 'fossere' which means 'to dig'.

6 How long were dinosaurs on Earth?
a) 160 years
b) 160 million years
c) 16 million years

7 What did *Prosaurolophus* have above its eyes?
a) horns
b) bumps
c) nostrils

8 What did Edward Hitchcock collect?
a) dinosaur films
b) dinosaur footprints
c) dinosaur eggs

9 *Procompsognathus* was the size of:
a) an elephant
b) a horse
c) a dog

Big isn't clever

The intelligence of a dinosaur did not have anything to do with its size. Medium-sized Saurornithoides was more intelligent than Brachiosaurus, which was a much bigger dinosaur.

Jurassic lake

In what was once a Jurassic lake in Southern Germany, more than 700 species of water animals have been found in the soft, limestone mud.

10 Where was the earliest dinosaur *Herrerasaurus* found?
a) China
b) Mongolia
c) South America

3 Which bird builds a nest mound like *Maiasaura*?

a) an emu
b) a flamingo
c) a mallee fowl

4 What did *Acrocanthosaurus* have on its back?

a) spines
b) knobs
c) feathers

5 What did *Maiasaura* cover its eggs with?

a) feathers
b) grass
c) leaves

Sharp as knives

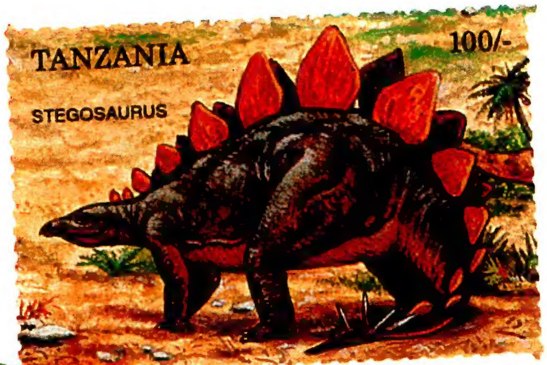
The large meat-eating dinosaur Indosuchus owned teeth which were 10cm long, a bit longer than your middle finger. Its teeth had jagged, zigzag edges – perfect for ripping into prey.

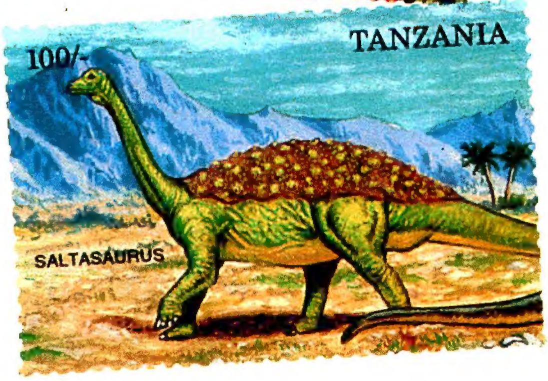
Look, no teeth!

Although pterosaurs dominated the skies during the time of the dinosaurs, they were not birds. They were flying reptiles. One major difference between the two is their beaks. Pterosaurs had sharp teeth in their beaks, whereas modern birds are toothless.

Stamping proud

The first dinosaur to appear on a postage stamp was Lufengosaurus, to mark the first dinosaur skeleton to be put on display in China. Since then, many other countries have produced stamps showing dinosaurs. These ones are from Tanzania.





Answers to the questions on inside back cover

POLACANTHUS **120 MYA**

Polacanthus (poh-lah-can-thus) means 'many spikes'. A rare, armoured dinosaur, *Polacanthus* was found in 1865 by the Reverend William Fox. Its fossils appeared as rocks fell away from a cliff on the Isle of Wight in southern England. *Polacanthus* was as long as a car and fed on low-growing plants and ferns.

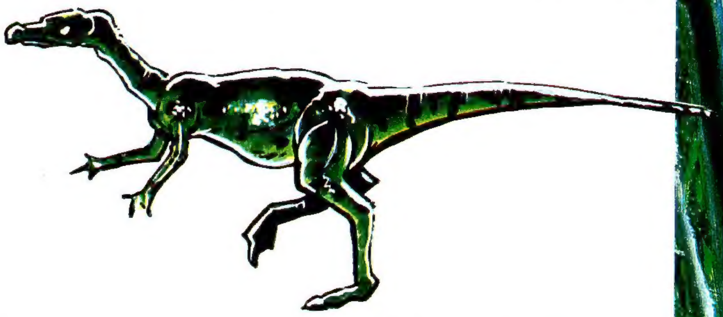
PRENOCEPHALE **70 MYA**

Prenocephale (pren-oh-sef-a-lee) whose name means 'sloping head', lived in the Late Cretaceous Period in the Gobi Desert, Mongolia. The sides of its steep domed head had small bony knobs. It was a medium-sized pachycephalosaur (thick-headed reptile), about as long as a car. It may have lived in small groups and challenged its rivals in fierce head-butting contests.

PROCERATOSAURUS **150 MYA**

Proceratosaurus (pro-ser-a-toe-saw-rus) was as heavy as a giant panda. It lived in southern England in the Mid Jurassic Period. *Proceratosaurus* means 'before *Ceratosaurus*' and like *Ceratosaurus* it had a small nose horn. At the front of its 30cm long head, *Proceratosaurus* had small, curved, blade-like teeth which it used to tear the flesh of its victims.

PROCOMPSOGNATHUS **215 MYA**



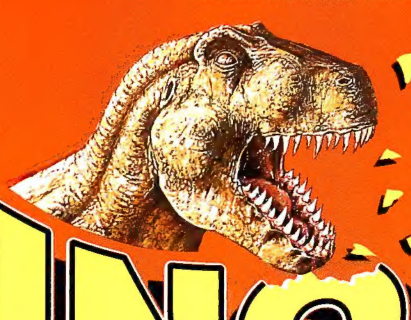
Only a few remains of this tiny meat-eater have been found. Lively *Procompsognathus* (pro-komp-sog-nay-thus) was about the size of a dog and fed on small animals and insects. *Procompsognathus* lived in the Late Triassic Period in southern Germany and its name means 'before *Compsognathus*'. So far no one has found its head, but its body seems to have been similar to a small ceratosaur.

PROSAUROLOPHUS **70 MYA**

Prosaurolophus (pro-saw-roh-loaf-us) was longer than an elephant. With bumps above its eyes, its head sloped down to a broad, toothless beak. It usually walked on four legs. It was a plant-eater and lived in Alberta, Canada, in the Late Cretaceous Period. Its name means 'before *Saurolophus*'.

MYA = MILLION YEARS AGO

COMING IN PART 39 OF



DINOSAURS!

Meet the weird dinosaurs that lived on islands in DINOSAUR WORLD. How dinosaurs used camouflage to hide from predators and sneak up on prey in SPOTTER'S GUIDE.

PLUS

Discover how whole herds of dinosaurs died in quicksand and floods in TIME DETECTIVE

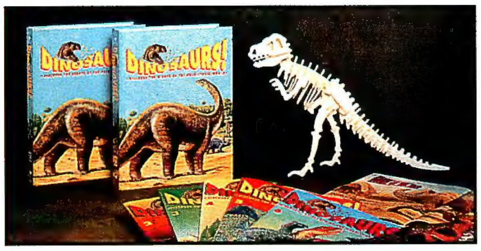
And

IDENTIKIT

ASK THE EXPERT

A TO Z

DINOSAURS! binders



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THE DINOSAURS! POSTER COLLECTION

Have you ever wanted to fill your room with dinosaurs? Now you have your chance – with the *Dinosaurs!* POSTER COLLECTION. Each poster is 820 x 570mm (nearly eight times the size of this page) and features a superb dinosaur artwork. You'll find facts and figures about the dinosaur on the back – PLUS a look at some other prehistoric animals. The eleventh poster is *Spinosaurus*.

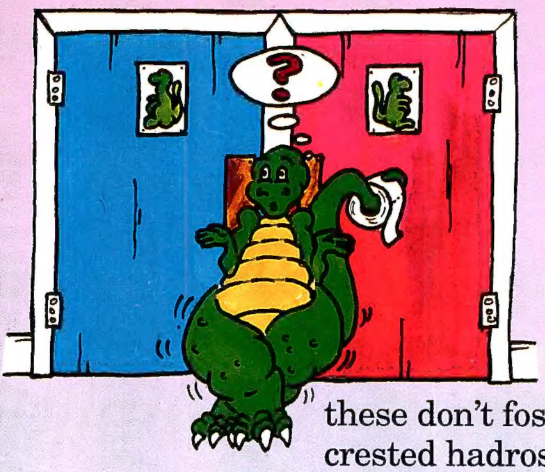
PICTURE CREDITS: front cover: Graham Rosewarne. Kobal 891 CL; Natural History Museum, London IFC, 905 CR; NHPA 895 BR/BKRD, BR, 897 C, CR, 902 TC, TR, 906-7 C; ZEFA 895 BC, 897 BR, 905 CL.
Artwork: Black Hat 892 T, 912; Robin Carter/WLAA 898-9; Mike Dorey 908-909; Edwina Goldstone/WLAA 906-907 T; Grisewood and Dempsey 890 B; Tony Jackson/WLAA 890 T; Deirdre McHale 904 T, 905 BR, 906 BL, 907 BR, BC; Stephen Message/WLAA 904 B; Nick Pike/WLAA 889, 891 B; Graham Rosewarne 892 B, 893 B, 894 B, 895 T, 896 BL, 897 TL; Peter Scott/WLAA 902-903 B; Steve White 900-901.
Stamps page 911 courtesy of James Davis and Son Ltd, Rickmansworth, England.

ANSWERS TO DINO FACT FILE QUESTIONS: 1.a 2.b 3.c 4.a 5.c 6.b 7.b 8.b 9.c 10.c

Dr. David Norman of Cambridge University answers your dinosaur questions

ASK THE EXPERT

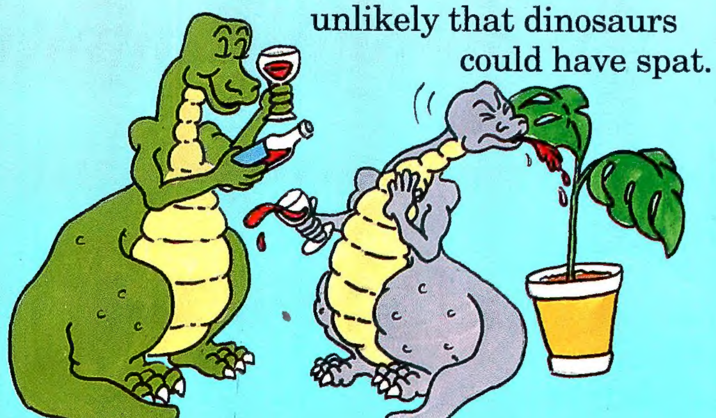
How can you tell the sex of a dinosaur?



Usually it is impossible to tell the sex of a dinosaur. Nearly all the clues about the sex of an animal are in its soft tissues, and these don't fossilize. In some crested hadrosaurs the males may have had one shape and the females another shape. One expert has looked carefully at the skulls and crests of hadrosaurs found in the same place, and divided them into two sorts, which may be male and female.

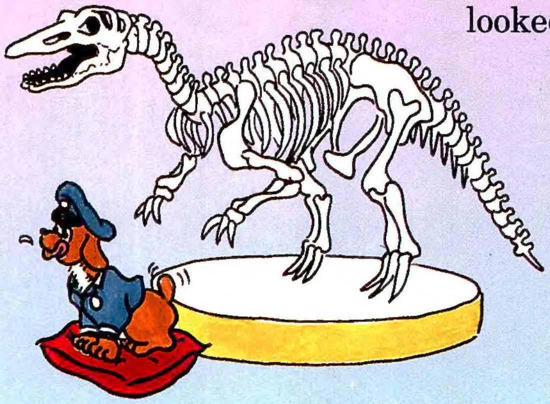
Could dinosaurs spit?

We're not sure. The spitting cobra has special channels in its teeth. Through these it squirts venom as it breathes out. No dinosaur with channelled teeth has yet been found, so it seems unlikely that dinosaurs could have spat.



Who looks after dinosaur bones in a museum?

Museums usually employ a team of curators to look after their fossils. They are trained to conserve, store and catalogue the fossils, so they can be studied. Although they seem to be hard, fossil bones contain minerals which can cause them to crumble if they are not properly looked after.



Which dinosaur had the most bones?

I think that most bones are found in the ankylosaurs (armoured dinosaurs). Not only did they have the usual number of bones (about 300) in their skeletons, but they also had hundreds of smaller bones embedded in their skin. These formed their armour. *Euoplocephalus*, one of the largest, even had bony eyelids. Its name means 'well-armoured head'.

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